NUMERICAL MODELLING OF ENTRANCE LOSSES IN INTERCEPTOR DRAINS

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ABSTRACT

The present study assumes the flow in a region near the interceptor drain to be radial in nature, applying the radial flow theory to determine the potential at the centre of drain considering the effect of drain size on the flow system. The resistance equation was applied to determine head vertically over the drain giving the fixed potential to the drain according to its depth from datum. In the second TRIAL, head over the drain was computed from the equation and put at the drain position instead of fixed potential at the drain.

The modified numerical model was applied for three different drain sizes of 0.15m, 0.25m, 0.375m and drain depths of -4m, -5m, -6m. The results so obtained, compared with the old numerical model by Nadeem (1991) and with the physical model of Chohan (1993). The comparison of free surface profile shows that the results have been improved to a certain extent with a difference in between them.

The comparison of drain interception of the three models when seen with that of constant drain depth, it was observed that the increase in drain diameter cause a considerable increase in drain interception but the increment was less for deeper drains as compared to the shallow drain depths. Thus showing that neither the new numerical model nor the old effects the drain size on the flow system.

The sensitivity of different parameters i.e. R_s, R_f, R_e and K_f used in the resistance equation (Equation 4.33) was observed. From the results it was seen that for even 0.1m R_s value, the flow towards the interceptor drain was not completely radial. It was due to the

dominance of canal flow from the left boundary. R_f has no effect on the model results whereas R_e has some effect on the flow system. It was observed that the increase in K_f value cause a decrease in drain interception.